MANUAL TOOTHBRUSH

The invention pertains to a manual toothbrush according to the preamble of Claim 1.

A manual toothbrush of this type is already known from FR-2600512 A1. The carrier of the toothbrush head is essentially realized in a U-shaped fashion such that the lateral, obliquely raised edge regions of the surface on the brushing side lie opposite of one another. In this case, the bristle clusters only converge to such a degree that their free ends form a receptacle space, into which individual teeth as well as part of the guns can penetrate during the brushing process. The insides and the outsides of the teeth and of the marginal gums are treated and cleaned by the bristle clusters in this fashion during the brushing process. The toothbrush head is connected in a pivoted fashion to the handle by means of a pivot bearing. Due to this measure, the toothbrush head also continuously encompasses the teeth during the brushing process if its direction changes, namely without having to readjust the handle in accordance with the alignment of the teeth. This simplifies the handling of the toothbrush and leads to superior brushing results in the region of the incisors as well as in the region of the molars.

This means that the toothbrush head is continuously oriented in accordance with the alignment of the teeth similar to a wheel guided on rails and pivoted relative to the handle in accordance with the direction of the teeth. This ensures that the opposing bristles are always directed essentially perpendicular to the inner and outer surfaces of the teeth and the gums. One less advantageous aspect of this manual toothbrush can be seen in that the toothbrush head needs to be aligned

with a row of teeth for each newly beginning brushing process such that it can be easily placed over the teeth and is not oriented transverse thereto.

The invention is based on the objective of developing a manual toothbrush that can be handled more easily and always assumes a defined home position during the alignment of the toothbrush head relative to the handle.

According to the invention, this objective is attained with the characteristics disclosed in the characterizing portion of Claim 1. The spring element that engages on the toothbrush head and is supported in the handle with the other end makes it possible to ensure that the toothbrush head always assumes a predefined position relative to the handle in the home position of the manual toothbrush. For example, if the receptacle space formed between the edge regions of the bristle clusters extends in the longitudinal direction of the handle, a user merely needs to guide the toothbrush head to the teeth in the direction in which the teeth extend. In this case, the direction of the handle also assumes the direction of the teeth, i.e., when brushing the molars that are directed toward the rear of the oral cavity, the handle is also held in this direction such that the receptacle space has also assumed this position and therefore can be easily placed over the teeth without requiring complicated manipulations. The invention also improves the brushing of the teeth in that, if the handle is slightly pivoted relative to the toothbrush head, the pressure exerted upon the tooth flanks on the inside and the outside of the teeth can be respectively increased or decreased under the control of the spring. The cleaning of the toothbrush head is also simplified because it can only yield to the hand movements during the cleaning process

by simultaneously building up a spring force, but not rotate as it is the case with the state of the art, in which no spring is provided.

The characteristics of Claim 2 make it possible to realize the customary brushing position for most manual toothbrushes such that the handling is simplified. If the bearing is arranged underneath the bristles, i.e., about centrally referred to the toothbrush head, the teeth are uniformly brushed on both edges if the bristle clusters are symmetrically arranged in the edge regions. However, the bearing may also engage on the toothbrush head eccentrically.

The characteristics of Claim 3 make it possible to restrict the pivoting range of the toothbrush head in order to find a realistic, feasible spring element solution that allows these pivoting ranges. When changing from the molars to the incisors, this makes it possible to also realize a manual change in direction of the handle in order to achieve larger pivoting angles, namely similar to a toothbrush head that is rigidly fixed on a handle.

The characteristics of Claim 4 make it possible to directly clean the biting surfaces of the molars as well as the cutting surfaces of the incisors from above. Even if no bristle clusters extend into the receptacle space from the bottom thereof, the biting and cutting surfaces can also be treated by configuring the bristle clusters arranged in the lateral edge region near the bottom such that they protrude toward the center and therefore can treat the biting and cutting surfaces during the brushing process. The characteristics of Claim 4 also make it possible to optimally clean the chewing surfaces with a separate bristle section on the bottom of the toothbrush head.

According to the characteristics of Claim 5, a superior brushing result of the chewing and cutting surfaces is achieved with a bristle cluster section that protrudes on the free front end of the toothbrush head at the height of the receptacle space.

The characteristics of Claim 6 cause the bristle clusters arranged in the edge regions to lie obliquely opposite of one another and to enclose the receptacle space for accommodating the teeth. The more concave the surface, the more significant the convergence of the bristle clusters on the edge regions and the more perpendicular their alignment relative to the lateral surfaces of the teeth. However, the alignment of the individual bristle clusters does not only depend on the alignment of the surface of the toothbrush head on the brushing side, but also the angle by which the individual bristle clusters protrude from the surface on the brushing side. Due to the utilization of both measures, the lateral surfaces of the toothbrush head do not have to be substantially angled relative to the bottom such that the installation of the bristle clusters by means of a bristle fitting machine is significantly simplified.

If the receptacle space is open toward the handle (Claim 7), the placement of the toothbrush head around the teeth and the handling are additionally simplified. The toothbrush head is slightly angled relative to the chewing surfaces of the teeth in this case because the bristle cluster section causes the distance between the toothbrush head and the chewing surfaces to be greater on the front end than on the open end of the receptacle space. However, this is actually desirable in order to ensure that the handle assumes a position in which it protrudes from the mouth with a slight downward angle

while the body is in an upright posture such that an improved hand position and therefore an improved handling are achieved.

Due to the characteristics of Claim 8, one end of the spring element is either stationarily mounted on the toothbrush head or on the handle in an embodiment in which the bearing consists of a pin-bore arrangement. The other end contacts the stopping elements that are respectively arranged on the handle or on the toothbrush head and thusly forms the freely movable end of the spring element. If the toothbrush head is pivoted in one direction while brushing the teeth, one stopping element contacts the free end of the spring element and bends the spring element such that a restoring force is generated. Once the toothbrush head is lifted off the teeth, the spring element presses the toothbrush head opposite to the actuated direction by means of the stopping element and returns the toothbrush hand into its home position. At this point, the tension of the spring is zero. If the toothbrush head is pivoted in other direction, the other stopping element presses the free end of the spring in the other direction and bends the spring such that a prestress is generated. Once released, the spring presses the toothbrush head back into its home position by means of the stopping element.

Although the toothbrush head is subjected to a restraint during the brushing process due to the bristle clusters enclosing the row of teeth, it always has the tendency to pivot back into its home position if the alignment of the row of teeth makes this possible. If the toothbrush head is pivoted during the brushing process, the restoring moment that constantly acts upon the toothbrush head in this case gives the bristles the tendency to adjoin the teeth and therefore

to clean and to massage the surface of the teeth as well as the gums during the movement of the manual toothbrush.

The characteristics of Claim 9 make it possible to achieve a simpler mounting of the toothbrush head on the handle, wherein the toothbrush head can still be pivoted back and forward relative to the handle about the longitudinal axis thereof. In this case, the pin has such a length that it penetrates into the bore and a short section of the pin protrudes on the other end. This short section is then widened by means of plastic deformation, namely under the influence of pressure or elevated temperatures, such that the free end engages behind the bore from the outside similar to a rivet head. However, it would also be conceivable to choose other mounting solutions, for example, the attachment of a retaining ring on the rear end of the pin that also engages behind the bore. It would even be possible to choose, for example, a snap-on connection that engages into a groove arranged on the pin and thusly holds the toothbrush head on the handle in a rotatable fashion by means of the pin. However, it would also be conceivable, for example, to screw a screw on the free end of the pin from the rear side, wherein this screw would also engage behind the bore in this case.

The spring element can be designed in a particularly simple fashion if it consists of a leaf spring or a rod spring (Claim 10). A leaf spring consists of a strip that is cut out of a thin sheet and subsequently deformed into its final shape by means of a bending tool. However, it could also be conceivable to realize the spring in the form of a rod with a round, quadrangular, oval or any other cross section, wherein the material respectively consists of a spring steel that is corrosion-resistant to water, saliva,

toothpaste, foods and other substances that are present while brushing the teeth.

If the spring element is shaped in accordance with the characteristics of Claim 11, a particularly simple adjusting device is formed that can be easily mounted and generates sufficient restoring forces, wherein one limb causes the restoring movement in one direction and the other limb causes the restoring movement in the opposite direction.

If the stopping elements are realized in the form of projections as proposed in Claim 12, they can be produced during the injection-moulding of the plastic toothbrush or the plastic toothbrush head. This also applies to the pin and the transverse web.

According to a second embodiment with the characteristics of Claim 13, the leaf spring or rod spring essentially extends linearly, wherein one end of the spring is fixed in the handle and the other end is fixed in the toothbrush head. In this embodiment, the center of the spring element is either fixed in the toothbrush head or in the handle and the two opposite free ends form the elastic ends that contact the stopping elements. The stopping elements are respectively arranged on the other component that does not carry the spring element. The stopping elements are realized such that, when the toothbrush head is turned in one direction, one stopping element contacts the free end of the spring element while the other stopping element moves away from the other free end of the spring element, wherein the distant stopping element contacts the spring element when the toothbrush head is turned in the other direction and the opposite stopping element moves away from the spring element. This embodiment can also be realized in a particularly

simple fashion without high assembly and manufacturing expenditures.

A third embodiment of the invention is defined with the characteristics of Claim 14. In this case, one free end of a leaf spring or rod spring is fixed on the handle while the other pivoted end is connected to an intermediate carrier that can be pivoted about the free end of the handle. If the intermediate carrier is realized in such a way that it can be clipped on the toothbrush head, the toothbrush head is pivoted on the leaf spring or rod spring by means of the intermediate carrier. In order to prevent compressive forces from being transmitted to the spring element, the intermediate carrier or the toothbrush head is additionally supported on the surface of the handle.

In a fourth embodiment with the characteristics of Claim 15, the spring element consists of a coil spring, the free ends of which are fixed in one of the two toothbrush components, i.e., either on the handle or on the toothbrush head, while a stopping element connected to the toothbrush head or the handle engages in the center of the coil spring and thusly prestresses one half of the spring element elastically in one direction while the other half is relieved. If the toothbrush head is pivoted in the other direction, the exact opposite conditions occur. This inventive arrangement makes it possible to achieve particularly high forces on the toothbrush head during the pivoting process because the spring functions as a tension spring as well as a pressure spring during a pivoting process.

In a fifth embodiment with the characteristics of Claim 16, the spring element consists of an elastomer that is made of plastic. In this case, the elastomers are also inserted into a recess that is either arranged in the

toothbrush head or in the handle, and the projections realized on the other component press against the elastomers when the toothbrush head is pivoted, i.e., a restoring moment is generated that acts upon and causes the toothbrush head to return into its home position (Claim 17). The spring force can be varied with an elastomer that has the same shape, but is made of a different material.

According to the characteristics of Claim 18, two elastomers that make it possible to realize different spring characteristics respectively act upon the toothbrush head in one pivoting direction.

A sixth embodiment is defined with the characteristics of Claim 19. In this case, an elastomer is injection-moulded between the toothbrush head and the handle in order to connect the two components to one another. The connecting length of the respective elastomer between the handle and the toothbrush head is chosen so long that an acceptable restoring force is generated. In this embodiment, the elastomer connection acts as a torsion rod, wherein the bearing point is not in contact with the elastomer in order to directly transmit the forces of pressure acting upon the toothbrush head during the brushing process to the handle because this allows a better adjustment of the brushing forces.

The characteristics of Claim 20 make it possible to achieve a simple elastic mounting of the toothbrush head on the handle, wherein webs or a sleeve-shaped section that respectively connect(s) the handle to the toothbrush head is/are injection-moulded to the rear side of the toothbrush head as well as to the upper side of the handle. Naturally, the mounting can also be realized with a bonding process. The elastic mounting

of the toothbrush head on the handle makes it possible for the toothbrush head to adapt itself to the row of teeth during the brushing process because it can be easily turned or pivoted relative to the handle. The pivoting resistance of the toothbrush head relative to the handle can be varied by choosing the hardness of the respective elastomer accordingly.

Due to the characteristics of Claim 21, the pressing force exerted upon the handle by the hand and transmitted from the handle to the tooth surface by the toothbrush head is directly supported on the handle. However, a pivoting movement can still be realized because the pin is guided in the blind bore in a pivoted fashion and elastically deforms the webs or the sleeve-shaped section made of elastomer. During the deformation, the elastomer is subjected to flexural, torsional, compressive and tensile stresses.

Several embodiments of the invention are illustrated in the figures and described in greater detail below. The figures show:

Figure 1, a perspective representation of the underside of a first embodiment of a toothbrush head according to the invention, wherein the handle is merely illustrated partially and in a shaded fashion;

Figure 2, a perspective side view of the toothbrush head according to Figure 1 and, in the form of a perspective exploded view, the upper side of an also partially illustrated handle, wherein the spring is realized in the handle and the stopping elements are realized on the toothbrush head;

Figure 3, a partial view of the underside of the toothbrush head according to Figure 1, wherein the spring is inserted, however, on the underside of the toothbrush head and the stopping elements are realized in the handle;

Figure 4, a bottom view of the end of a toothbrush according to a second embodiment on the side of the toothbrush head;

Figure 5, a perspective top view of the toothbrush head and the handle, wherein both components are illustrated in the form of an exploded view;

Figure 6, a schematic representation of the underside of a manual toothbrush, wherein the spring element (illustrated in an exposed fashion) consists of a coil spring, in the center of which a stopping element arranged on the handle engages;

Figure 7, a longitudinal section through the handle of a fourth embodiment of a manual toothbrush in the region of the bearing, wherein the spring elements consist of elastomers;

Figure 8, a longitudinal section according to Figure 7 through a fifth embodiment, wherein four elastomer sections are used as spring elements, and

Figure 9, a longitudinal section that transversely extends through a sixth embodiment of a manual toothbrush, wherein the toothbrush

head is connected to the handle by means of a torsion rod in the form of an elastomer.

In Figures 1-9, the manual toothbrush 1 consists of a handle 2 that is only illustrated partially in the figures and a toothbrush head 3 that is mounted on a bearing head 43 on the front end 5 of the upper side 4 of the handle 2. The toothbrush head 3 features a surface 6 on the brushing side, from which bristle sections 12, 13, 14, 15 (Figures 2 and 5) protrude that consist of several bristle clusters 8 and collectively form the bristling 7. The surface 6 on the brushing side is preferably realized in a concave or shell-like bent fashion such that the outer edge regions 10, 11 referred to the longitudinal axis 9 in Figures 2 and 5 face one another, i.e., the outer edge regions extend upward from the upper side 4 of the handle 2.

In a top view of the rear side 21 of the toothbrush head 3, said toothbrush head extends, according to Figure 4, essentially transverse to the handle 2 and features an extension 17 on its front (in Figure 4 upper) region, namely such that the toothbrush head 3 essentially has, if viewed from the rear side 21, an outer contour similar to that of a "manta ray."

According to Figures 2 and 5, the bristling 7 is essentially divided into four bristle sections 12, 13, 14, 15, the rows of which essentially extend in the direction of the longitudinal axis 9. The bristle section 14 that, if viewed from the top, essentially describes a rectangle extends centrally in the bottom, wherein the cross sections of the individual bristle clusters 16 form elongated ovals that extend transverse to the longitudinal axis 9 in this case. The bristle sections 12 and 13 are situated laterally adjacent to the central bristle section 14 and essentially protrude

perpendicularly from the obliquely elevated surface 6 on the brushing side, wherein the individual bristle clusters 8 of these bristle sections preferably have a round cross section of identical diameter in this case. The bristle sections 12 and 13 are respectively composed of three rows of bristle clusters 18, the outer edge row of which essentially follows the contour of the edge of the toothbrush head 3 and therefore forms an outwardly curved outer row. The bristle clusters 18 preferably extend perpendicular to the surface 6 on the brushing side such that they converge due to the curved elevated surface 6, however, only to such a degree that a receptacle space 19 is created between their ends that has such dimensions that the bristle ends are able to treat the chewing and cutting surfaces as well as the inside and the outside of the lateral tooth surfaces equally well. Depending on the inclination on the edges of the surface 6 on the brushing side, these bristle clusters may, however, also protrude from the surface in an inclined fashion.

The upper side of the outwardly open receptacle space 19 is limited by the bristle section 15 that is composed of bristle clusters 20 with an essentially quadrangular or trapezoidal cross section that are slightly inclined toward the front point 38 such that the free ends of the front bristle clusters 20 according to Figure 4 protrude upward beyond the contour of the toothbrush head 3 (Figure 4). The bristle section 15 acts like a closed, thick bristle cluster that reaches the rearmost molars particularly well during the brushing process due to its inclination. In addition, the individual cross sections of the bristle clusters 20 and therefore also their overall cross section that forms the bristle section 15 are larger per surface unit referred to the entire brushing surface 6 such that they are able to generate

a higher resistance to the tooth surfaces during the brushing of the rear molar regions and the rear molars are cleaned particularly well.

The rear of the receptacle space 19 according to Figures 2 and 5 is open toward the handle 2 such that the teeth are able to more easily engage into the receptacle space 19 from this side without encountering a significant resistance and the toothbrush head 3 is better guided by the teeth. In this case, the toothbrush 1 is held at the handle 2 such that it protrudes from the mouth at a slight downward angle.

According to Figures 1-3 and 7-9, the rear side 21 that faces away from the surface 6 on the brushing side is provided with a bearing arrangement 22 that cooperates with the toothbrush head 3 and the handle 2. According to Figures 1-3, the bearing arrangement 22 consists, among other things, of a pin 23 that protrudes about centrally from the toothbrush head 3 on the rear side 21. A plane 41 around the pin 23 is recessed relative to the outer surface 40 of the rear side 21 and, in the assembled state of the handle 2 and the toothbrush head 3, serves as a limiting surface for partially accommodating the spring element 26. On the other side, the spring element realized on the face in a depression 75 on the bearing head 43 is limited by the surface 43. A stopping element 27 protrudes outward from the recessed plane 21 on the toothbrush head 3 underneath the pin 23, wherein said stopping element features lateral stopping surfaces 28, 29 that engage between the limbs 32, 33 of the spring element 26 in the assembled state.

In Figure 2, a bore 30 is arranged on the bearing head 43 of the handle 2 in order to receive the pin 23 in a precisely fitted fashion. The center of the pin 23

forms the pivoting axis 36, about which the pin 23 can be pivoted in the bore 30 of the bearing arrangement 22. In Figures 1-9, the angle between the longitudinal axis 9 of the handle and the pivoting axis 36 is approximately 90 degrees. In another variation, this angle may also be larger or smaller than 90 degrees. A guide arbor 25 protrudes centrally referred to the longitudinal axis 9 above the bore 30, wherein a spring element 26 in the form of a U-shaped leg spring 26 extends around this guide arbor. In the assembled state of the manual toothbrush 1, the free ends of the limbs 32, 33 adjoin the stopping surfaces 28, 29 of the stopping element 27 from outside. The stopping element 27 engages into a corresponding depression 44 on the bearing head 43 in this case. However, the lateral dimensions of the depression 44 need to be so large that the stopping element 27 has sufficient lateral clearance when the toothbrush head 3 is pivoted about the longitudinal axis 9 within the permitted angular range.

The equivalent embodiment according to Figure 3 merely can be distinguished from the embodiment according Figure 2 in that the spring element 26 in the form of a leg spring is not positioned on the bearing head 43 of the handle 2, but rather around the guide arbor 43 that protrudes from the rear side 21 in this case rather than from the handle 2. The limbs 32, 33 of the spring element adjoin the pin 23. According to Figure 1, the stopping element 27 (illustrated with broken lines) with its stopping surfaces 28, 29 is realized on the handle 2. The depression 44 for accommodating the stopping element 27 and the spring element 26 is realized on the toothbrush head 3 and extends around the pin 23 on the rear side 21.

In order to mount the toothbrush head 3 on the handle 2, the spring element 26 according to Figure 2 is initially placed on the guide arbor 25 on the bearing head 43 in such a way that the two limbs 32, 33 extend on the edge of the bore 30. The pin 23 is now inserted into the bore 30 and the toothbrush head 3 is displaced toward the handle 2 until the stopping element 27 engages between the two limbs 32, 33 and their ends adjoin the stopping surfaces 28, 29. Although this is not illustrated in the figures, the free end of the pin 23 that protrudes beyond the bore on the underside 35 is now subjected to a plastic deformation from the rear such that the free end is widened and extends beyond the edge of the bore 30.

Instead of thermally fixing the pin 23 on the rear side of the bearing head 43 in a rivet-like fashion, it would naturally also be possible to arrange a groove on the free end of the pin 23 and to insert a retaining ring into this groove after attaching the toothbrush head 3 to the bearing head 43, wherein said retaining ring is supported on the rear side 21 and thusly holds the toothbrush head 3 on the handle 2 in a pivoted fashion. Alternatively, a (not-shown) transverse bore could be produced in the pin 23 for accommodating a cotter pin. Naturally, it would also be conceivable to use screw connections or other conventional mounting means used in mechanical engineering. It goes without saying that the mounting parts to be used are preferably also made of plastic.

When brushing the teeth, the toothbrush head is placed on the teeth in such a way that a row of teeth longitudinally engages into the receptacle space 19. If the toothbrush head 3 is placed, for example, on the front incisors, the handle is essentially held in the direction of the front row of teeth, i.e., such that

the handle tangentially extends away from the tooth surface. In this case, the handle is held such that it is slightly inclined downward referred to the cutting surfaces of the teeth and the teeth completely fill out the open region of the receptacle space 9. The other end, i.e., the bristle section 15, more or less lies on and laterally adjoins the cutting surfaces of the teeth.

When transferring the toothbrush head 3 from the incisors to the molars, the toothbrush head 3 is pivoted about the pin 23 on the bearing head 43 if the handle 2 is not readjusted. In this case, a stopping surface 28 or 29 elastically presses a limb 32 or 33 of the spring element 26 outward. The other limb 33 or 32 is supported on the pin 23 in such a way that the region of the spring element 26 extending around the guide arbor 25 is bent under the influence of the applied force. This force is continuously exerted upon the lateral tooth surfaces, namely on the inside as well as the outside, and thusly improves the brushing result. The transverse forces exerted upon the lateral walls of the teeth only diminish below a noteworthy value if the longitudinal axis 9 of the handle 2 extends symmetric to the longitudinal axis of the toothbrush head 3 and the handle 2 extends in the longitudinal direction of a row of teeth. However, since the alignment of the teeth rarely corresponds to the movements of the handle 2, the elastic pivoting of the toothbrush head 3 causes the toothbrush head to adapt to the respective row of teeth.

The spring element 26 according to the invention makes it possible to exert a clockwise as well as a counterclockwise torque upon the toothbrush head 3. The manual toothbrush 1 with U-shaped bristling can be guided particularly well during the brushing process

due to the limited decoupling of the toothbrush head 3 from the handle 2.

Figures 4 and 5 show a third embodiment of the invention. Instead of the U-shaped spring element 26 used in Figures 1-3, the spring element 26 consists of a leaf spring that preferably extends linearly and is pressed into slots 24 in the handle 2 and in an intermediate carrier 50. In this embodiment, the circular outer surface 45 forms the pivoting surface, wherein the pivoting axis of the intermediate carrier 50 is still arranged about centrally on the bearing head 43. Its bearing surface 46 that is also realized in the shape of a graduated circle adjoins the outer surface 45 in this case. The spring element 26 protrudes to such a degree on the face 47 that the spring element 26 is able to pivot back and forward in a frictionless fashion on its upper end in Figure 5. For this purpose, the spring element 26 is embedded in a depression 48 that is opened toward the top by means of a slot 49. The slot 49 serves for enabling the spring 26 to freely move back and forward laterally when the bearing head 43 is pivoted.

Figure 5 also shows that the intermediate carrier 50 is connected to the toothbrush head 3 by rigidly inserting the outer edge 51 of the intermediate carrier 50 into a corresponding recess 52 arranged on the rear 21 (Figure 4). The mounting could be realized, for example, by means of clipping, pressing, bonding or the like. The connection may also be realized such that it can be manually disengaged at any time in order to be exchange a component, for example, when the bristle clusters 16 of the bristle sections 12-15 are worn out. In order to maintain the structural height of the toothbrush 1 as low as possible, a step 53 is arranged on the upper side 4 of the handle 2 (Figures 2 and 5).

Figure 6 shows a schematic representation of a fourth embodiment of the toothbrush head 3 and the handle 2, wherein the toothbrush head 3 is also mounted on the handle 2 in a rotatable fashion by means of a pin 23. A spring element 26 in the form of a coil spring is inserted into a receptacle space 54 arranged on the handle 2, wherein a stopping element 27 engages into the region of a central winding of the spring element. If the toothbrush head 3 is pivoted to the left or the right about the pin 23, the corresponding outer stopping surface 28 or 29 respectively engages on a spring winding 55 such that the corresponding section of the spring 26 is prestressed while the other section is relieved. The spring element 26 is laterally supported on the stopping surfaces 71, 72 in the receptacle space 54. Due to the prestress of one half of the spring element 26, the toothbrush head 3 is pivoted back into its home position shown in Figure 6 after it is released. In this case, the spring element 26 may also consist of a wire spring that is coiled or injection-moulded of plastic.

In Figure 7, the toothbrush head 3 is mounted on the bearing head 43 in accordance with the description of Figures 1-3, i.e., this aspect is not described in greater detail at this point. In contrast to the spring arrangement according to Figures 1-3, the spring element 26 consists of two trapezoidal elastomer pieces 55, 56 that are inserted into a recess 57 on the bearing head 43 in this case. The stopping element 27 that is integrally moulded on the bearing head 43 engages between the two elastomer pieces 55, 56, wherein the stopping surfaces 28, 29 of said stopping element adjoin the lateral surfaces of the elastomer pieces 55, 56. The stopping element 27 engages into a bulge 58 that widens downward according to Figure 7 and

is laterally limited by the boundary surfaces 59, 60. When the toothbrush head 3 is pivoted, these boundary surfaces 59, 60 serve as stops relative to the stopping element 27 so as to limit the pivoting range in one as well as the other direction. The elastomer pieces 55, 56 are supported on boundary surfaces 73, 74 in the bulge 57 with one end and on the stopping element 27 with the other end.

The fifth embodiment of the manual toothbrush 1 shown in Figure 8 merely can be distinguished from the embodiment according to Figure 7 in that four elastomer pieces 61-64 are guided in a recess 65 rather than two elastomer pieces, wherein these four elastomer pieces are spaced apart in the longitudinal direction by two diametrical stopping elements 27 on the pin. In this case, the free ends of the stopping elements 27 also engage into bulges 58 that feature the lateral boundary surfaces 59, 60 for limiting the pivoting angle of the toothbrush head 3 analogous to Figure 7. In the horizontal direction, the elastomer pieces 61-64 are limited by projections 66, 67 that are integrally moulded on the bearing head 43 and extend into the close vicinity of the pin 23.

If the toothbrush head 3 according to Figure 8 is turned, for example, in the clockwise direction, the upper right and the lower left elastomers 64 and 62 are prestressed while the two other elastomers 63 and 61 lie free. If the toothbrush head 3 is turned in the counterclockwise direction, the exact opposite conditions occur and the elastomers 63, 61 are prestressed while the elastomers 64, 62 are relieved.

In the sixth embodiment according to Figure 9, a journal 68 extending from the rear side 21 engages into a blind bore 69 arranged on the bearing head 43 of the

handle 2 and adjoins the bottom thereof. On the rear side 21 of the toothbrush head 3 as well as on the upper side 4 of the bearing head 43, a sleeve-shaped elastomer ring 70 is injection-moulded around the journal 68 in order to serve as a spring element 26 for elastically returning the toothbrush head 3 into its home position after it is turned and after it is axially pivoted, respectively. During the brushing process, the toothbrush head 3 is supported on the bottom of the blind bore 69 by the journal 68.

Instead of using an elastomer sleeve 70, it would also be conceivable to injection-mould individual (not-shown) interconnected webs on the surface 4 as well as on the rear side 21. A thermoplastic elastomer (TPE) proved particularly practical as the injection-moulding material. The handle 2 and the toothbrush head 3 preferably consist of polypropylene. The same materials can be used for the fourth and the fifth embodiment.